

CLAIMS

1. A method for extruding a tire rubber material by a positive displacement extruding system that includes, as seen from an upstream side of the tire rubber, a screw extruder unit, a gear pump unit and an extrusion head unit with an extrusion nozzle, which are connected in series with each other, said method comprising the steps of:

measuring the temperature of the rubber material flowing through the extruding system; and

10 controlling the rubber material to be within a predetermined temperature, in accordance with the measured temperature of the rubber material, while the tire rubber is caused to flow through the extruding system, and maintaining the predetermined temperature of the rubber material before it is extruded from the extrusion nozzle.

15 2. The method according to claim 1, wherein the rubber material flowing through the screw extruder unit and the gear pump unit is maintained at a temperature within a range of approximately 85-95°C.

3. The method according to claim 1, wherein the rubber material flowing through the extrusion head unit is maintained at a temperature within a range of approximately 95-100°C.

20 4. The method according to claim 1, wherein the screw extruder unit of the extruding system includes a cylinder and a screw that is rotatable in the cylinder, and wherein the cylinder is controlled to have a temperature that is lower than the temperature of the rubber material flowing adjacent to a downstream end of the screw.

25 5. The method according to claim 1, wherein at least one of said screw extruder unit, said gear pump unit and said extrusion head unit of the extruding system is provided with a heater that is operated in accordance with said measured temperature of the rubber material, and wherein said heater is operated before said extruding system is operated, so as to preheat the rubber material 30 within said extruding system.

6. The method according to claim 1, wherein at least one of said screw extruder unit, said gear pump unit and said extrusion head unit of the extruding system is provided with a pressure sensor for measuring the pressure of the

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rubber material flowing through the extruding system, and wherein said screw extruder unit and/or said gear pump unit is operated at a speed that is controlled in accordance with the pressure of the rubber material measured by said pressure sensor.

5 7. The method according to claim 1, wherein said extruding system is charged with a rubber material at a temperature within a range of approximately 20-30°C.

10 8. The method according to claim 1, wherein said extruding system is charged with a rubber material at a temperature within a range of approximately 10 60-80°C.

15 9. A positive displacement extruding system for extruding a tire rubber material, including, as seen from an upstream side of the tire rubber, a screw extruder unit, a gear pump unit and an extrusion head unit with an extrusion nozzle, which are connected in series with each other, said system comprising:

15 at least one temperature sensor provided for at least one of said screw extruder unit, said gear pump unit and said extrusion head unit, for measuring the temperature of the rubber material flowing through the extruding system; and
control means for controlling the rubber material to be within a predetermined temperature, in accordance with the measured temperature of the
20 rubber material, while the tire rubber is caused to flow through the extruding system, and maintaining the predetermined temperature of the rubber material before it is extruded from the extrusion nozzle.

25 10. The system according to claim 9, wherein said control means comprises at least one heater provided for at least one of said screw extruder unit, said gear pump unit and said extrusion head unit, said at least one heater being operable in accordance with said measured temperature of the rubber material.

30 11. The system according to claim 9, further comprising at least one pressure sensor provided for at least one of said screw extruder unit, said gear pump unit and said extrusion head unit, for measuring the pressure of the rubber material flowing through the extruding system, and wherein said screw extruder unit and/or said gear pump unit is operable at a speed that is controlled in accordance with the pressure of the rubber material measured by said pressure sensor.

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